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The One Appointment Pulpotomy For Primary Molars

CHILDREN'S DENTISTRY, P.C. NEWSLETTER

PRACTICAL CLINICAL TIPS: KEEPING YOUR PEDIATRIC SKILLS CURRENT

Introduction

In this issue we will discuss the indications and the technique for one appointment pulpotomies for primary molars. We do not do pulpotomies in primary incisors or canines because studies show pulpectomies are more successful.

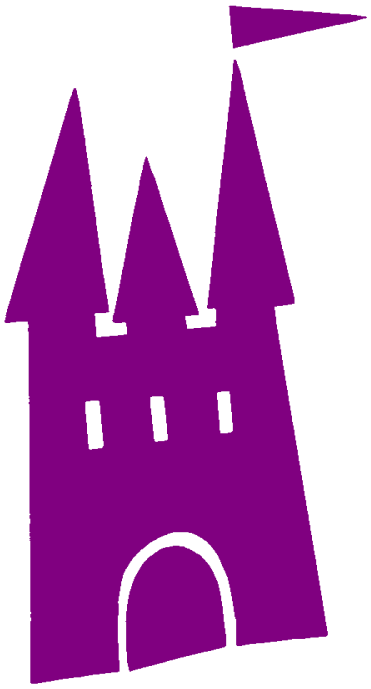
Definition

Pulpotomy is a procedure used for vital teeth where:

- All of the coronal pulp tissues are removed from the tooth and the radicular pulp tissues are left intact.
- A pulp dressing is placed over the floor of the pulp chamber in contact with the radicular pulp tissues.
- A restoration is placed.

Selection of Teeth (Diagnostic Considerations)

A careful assessment of the condition of the pulp tissues enhances the probability of successful treatment of the tooth. Unfortunately, there are no diagnostic aids available that illustrate the exact extent of degeneration of pulp tissues. No correlation between clinical diagnostic evaluation and microscopic findings of pulp tissues examined has been demonstrated. In spite of this lack of correlation, clinical experiences have shown that, if several diagnostic factors are examined carefully, the percentages of clinical success are high. The factors considered are pain, mobility and percussion, radiographic evaluation, soft tissue findings and postamputation bleeding.



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Pain

Pain is the only symptom and it is one of the most important factors of the selection process.

- Chronic Pain: Usually denotes that all of the pulp tissues have degenerated. These teeth should not be considered for pulpotomy.
- Provoked Pain: Does not necessarily indicate pulp disease. Although frequently severe, provoked pain may indicate that some dentin is exposed and that it responds to thermal changes or chemical stimuli, such as sugar. This pain most frequently occurs when a person eats and drinks or when air contacts the exposed dentin surfaces. Pain also can be provoked in a tooth with a deep carious lesion where a relatively thin layer of sound, vital dentin separates the lesion from normal pulp tissues. This layer of dentin is flexible and when a bolus of food is pressed into the lesion, the dentin layer is compressed against the pulp tissues causing a painful response. In this tooth, should a pulp exposure result from the complete excavation of the carious lesion, other factors being equal, most of the pulp tissues would most likely be healthy whereas only those tissues near the exposure site may be damaged or diseased.
- Spontaneous Pain: Occurs during periods of relative quiescence, such as watching television or sleeping. It is indicative of advanced degeneration of the pulp tissues. The extent of damage is usually determined after the coronal tissues have been amputated. Teeth exhibiting this type of pain should not be considered as good candidates for pulpotomy until the coronal tissue has been removed.

Mobility and Percussion

Excessive mobility of a tooth either means it is about to exfoliate or that the supporting structures of the tooth have been damaged. Damage of these supporting tissues results from the extension of the degenerative process from the pulp tissues. If discomfort is caused by percussion of the tooth, most likely the periodontal structures are involved. Excessively mobile teeth or teeth tender to percussion are not candidates for pulpotomy but instead should either be extracted or receive a pulpectomy.

Pre-operative

Radiographic Evaluation

Evidence of pathoses observed in the radiographs of the tooth contraindicate pulpotomy. Most pathologic radiolucencies of primary molars are found in the furcation. Internal resorption of the root canals indicate involvement of the radicular pulp tissues. Pulpotomy is contraindicated if furcation or root canal pathoses are observed.

If it appears that the tooth will exfoliate in a short time and that the underlying permanent tooth will erupt shortly afterwards, pulpotomy is also contraindicated. If the tooth has been damaged by the ectopic eruption of a permanent molar a pulpotomy is contraindicated. If these primary teeth become pulpally damaged or have extensive resorption and/or decay, they should be extracted.

Soft Tissue Findings

The presence of a parulis fistula or of pus in the gingival crevice after compression of the surrounding gingival tissues is a sign that the pulp and supporting periodontal tissues are damaged. A pulpotomy is contraindicated.

In spite of careful diagnostic evaluation of the condition of the pulp and periodontal tissues of a tooth for the pulpotomy procedure, treatment failures occur. However, the percentages of success are increased if the pulpotomy is reserved for those teeth in which it has been determined that the damage to the pulp has been confined to the coronal tissues. This determination is made when the number and size of pulp exposures are noted and the postamputation bleeding is assessed.

Immediately after pulpotomy note the normal appearance of blood without suppuration or excessive hemorrhage.

Appearance of pulp stumps just before placement of paste.

Rationale of Chemical Agents Used for Pulpotomies

Formocresol has been the most researched and most widely used treatment. Because it is considered to be mutagenic and possibly carcinogenic, dilution of the full strength agent is recommended.

We purchased "Buckley's Formo Cresol" from Sultan Chemists, Inc., Englewood, NJ 07631, 1-800-637-8582. It can be obtained from any dental supply company.

We dilute the formocresol solution, 10 parts glycerin and 1 part "Buckley's Formo Cresol". Each morning a thick paste of USP zinc oxide and USP eugenol is mixed, to which is added one drop of the 10:1 solution of glycerin: Buckley's. The total amount of paste is approximately one tablespoon, enough for the day.

We do not use IRM, or any catalyst in the zinc oxide/ eugenol so that any residual paste will be resorbed after the pulpotomized tooth exfoliates. We do not use direct application formocresol to the pulp stumps for 5 minutes. Systemic distribution of the formocresol has been shown to occur in repeated studies. In order to avoid the cytotoxic tissue effects, we have been using the technique of 1 drop of diluted Buckley's solution with a multiple dose mixture of USP ZOE for 21 years. By placing a drop of very diluted formocresol in a multiple dose mixture, the same fixation of tissue occurs without the risks of an adverse response. We showed a 94% success rate over a period of 2-7+ years in a study we conducted in our practice using this technique. (1)

Pulpotomy paste in place. Note thick consistency of mixture.

Number and Size of the Pulp Exposures

As a general rule, the larger the size of an exposure or the presence of more than one exposure, the more extensive the damage of the pulp tissues. In these cases the final determination to continue with the pulpotomy is deferred until postamputaion bleeding is assessed.

Postamputation Bleeding

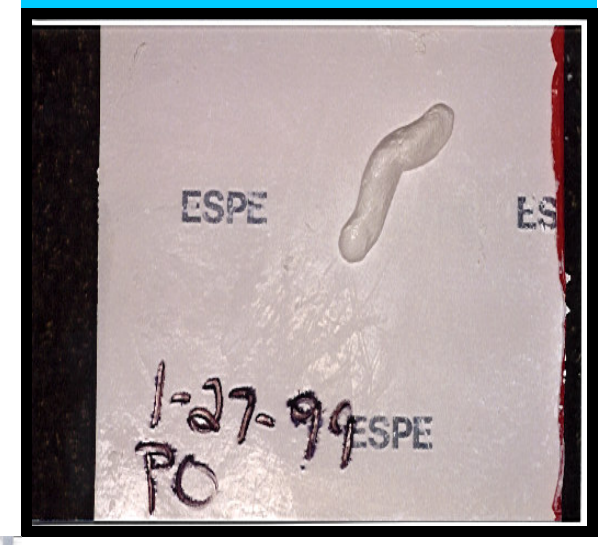
Bleeding from healthy radicular pulp tissues usually stops 3-5 minutes after the coronal pulp tissues are amputated. If bleeding continues it usually means that the radicular tissues are hyperemic or inflamed and the treatment of choice is removal of the radicular pulp tissues (root canal therapy).

(1) Hicks MJ, Barr ES, Flaitz CM: Formocresol pulpotomies in primary molars: a radiographic study in a pediatric dentistry practice. J Pedodon 10:331-

Technique

- The tooth to be treated should be anesthetized and isolated with a rubber dam.
- Remove all caries.
- Remove the roof of the pulp chamber with a high speed handpiece.
- Amputate the coronal pulpal tissue with a no.4 round bur in a slow speed handpiece, including the tissue at the orifice of each canal.
- Wash the chamber with water from the air/water syringe for 5 seconds.
- Place a mix of USP ZOE with small drop of diluted Buckley's Formocresol in the chamber. Use a dry cotton pellet to tap it in place using moderate pressure.
- Restore the molar with a stainless steel crown.

Note thick consistency of pulpotomy paste.



After placement of SSC.

Glycerin, paste and formocresol.

Summary Table
Criteria for Treating a Primary Molar with a PULPOTOMY

- Any mechanical or carious exposure. We do not advocate direct pulp capping of primary molars because the success rate is much lower compared to the 94% success rate of a pulpotomy.
- No root resorption, either from an ectopic eruption, physiologic or pathologic causes.
- No bony pathologic changes in the furcation, periapical area or PDL.
- No mobility.
- No soft tissue parulis.
- No spontaneous unprovoked pain.
- Vital tooth.
- Normal hemostasis following application of light pressure with a wet cotton pellet against pulp tissue remaining in the root canals.
- The primary molar is restorable.